

**REMARKS**

This is in response to the Office Action dated January 11, 2010. Claims 4-34 are pending and stand rejected in the outstanding Office Action. Claim 4 has been amended.

The objection to claim 4 for informalities is respectfully traversed. Claim 4 has been amended to change “the gate” to “a gate”, and “the range” to “a range”, to overcome the Examiner’s objection.

The rejection of claims 4-34 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite, is respectfully traversed.

More specifically, the Examiner stated that, regarding claim 4, it is not clear “with respect to what voltage the recited “threshold voltage” is measured, because “a voltage is always measured with respect to a certain reference voltage. In other words, it is not clear whether the ‘threshold voltage’ is measured with a source region grounded and a drain region applied a bias, which is a common case for measuring a threshold voltage, or a different set of biases are applied to a source and a drain region of the semiconductor device, and what the source/drain biases are, because a threshold voltage depends on source/drain biases”. Moreover, the Examiner cited two instances in the specification with allegedly different biasing for the threshold voltage, namely, Fig. 17 showing  $V_{DS} = 10\text{ V}$  when measuring a threshold voltage, and in p. 64, lines 2-5 of the specification allegedly teaching that both source and drain electrodes are grounded when measuring the threshold voltage.

With the amendment made to claim 4, it is made clear that the threshold voltage refers to a biasing scheme where a fixed voltage of 10V is applied between the drain and the source region, hence overcoming the Examiner’s indefiniteness rejection.

Moreover, the term “substantially” is used in claim 4 to indicate the range for the threshold voltage, which term has been deemed by the courts to be definite “because one of ordinary skill in the art would know what was meant by ‘substantially equal.’” *Andrew Corp. v. Gabriel Electronics*, 847 F.2d 819, 6 USPQ2d 2010 (Fed. Cir. 1988), MPEP 2173.05(b), emphasis added.

The rejection of claim 4 under 35 U.S.C. § 103(a), as allegedly being unpatentable over *Kawasaki et al.* (US 2003/0047785) in view of *Goodman* (US 4,204,217) and further in view of *Yan et al.* (US 2003/0218222) and *Vijayakumar et al.* (US 4,751,149), is respectfully traversed.

Amended claim 4 recites “said active layer includes said nitrogen and hydrogen as intentionally added dopants having concentrations so that a threshold voltage of a gate voltage of the semiconductor device, when a voltage between a drain and a source region is fixed at 10V, is controlled to be substantially in a range between 0V and 3V”. Support for the amendment can be found, for example, in Fig. 17 of the instant specification.

*Kawasaki/Goodman/Yan/Vijayakumar* does not teach or suggest this feature.

The Examiner admitted that *Kawasaki/Goodman/Yan* fails to teach that hydrogen is intentionally added to the active layer, so that a threshold voltage of a gate voltage of the semiconductor device is in a range of 0V to 3V (claim 4), wherein the active layer is formed under an atmosphere containing hydrogen peroxide (claim 5), and turned to *Vijayakumar* for the limitation of an atmosphere containing hydrogen peroxide.

According to the Examiner, “hydrogen would be an intentionally added dopant, and a threshold voltage of a gate voltage of the semiconductor device is inherently in a range of approximately 0V to 3V under certain source and drain bias conditions, because Applicants do not specifically claim under what bias conditions the ‘threshold voltage’ is measured, and do not

define how close to '0V to 3V' would be '*approximately 0V to 3V*', emphasis included, see p. 6 of the Office Action.

Even though Vijayakumar teaches doping using hydrogen peroxide, nowhere in Kawasaki/Goodman/Yan/Vijayakumar is there a teaching regarding the value of the threshold voltage being substantially between 0V and 3V, let alone the value being controlled by the concentration of the hydrogen and nitrogen dopants.

In addition, unlike the Examiner's assertion, doping the active layer with hydrogen does not *inherently* yield a threshold voltage in the claimed range, even "under certain source and drain bias conditions". It is the concentration of the dopants that produces the claimed range for the threshold voltage, not just the source and drain bias conditions. In any case, according to the courts, "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." In re Robertson, 169 F3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999), MPEP 2112 IV, emphasis added.

The variation over time of the applied gate voltage threshold is shown in Fig. 18 of the instant specification. At a certain time, the potential of the source and drain is made into a ground potential, and a voltage of +30V is applied to the gate electrode. Then, the Id-Vg property is measured as Vds=10V, the gate voltage threshold is requested and the potential of the source and drain is made into a ground potential again. The measurement of the Id-Vg property is repeated and the variation over time of the threshold voltage value is measured. While this method of measurement shows a difference in the gate voltage, one skilled in the art would perform and carry out the same measurement. This would be understood by one skilled in the art by referring to Fig. 18.

For the above reasons, claim 4 is allowable.

It is respectfully requested that the rejection of claims 5-34, each one dependent from claim 4, also be withdrawn.

In view of the foregoing and other considerations, all claims are deemed in condition for allowance. A formal indication of allowability is earnestly solicited.

The Commissioner is authorized to charge the undersigned's deposit account #14-1140 in whatever amount is necessary for entry of these papers and the continued pendency of the captioned application.

Should the Examiner feel that an interview with the undersigned would facilitate allowance of this application, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

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